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Heavy Mineralogy of Effluent-Affected Sediment and Other Deposits, Palos Verdes Shelf, Southern California (abstract from poster): EOS Trans. AGU, 76(3), Ocean Sciences Meeting Supplement OS1, 1996.

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Historic anthropogenic and accelerated natural sources of sediment to the Palos Verdes margin, southern California, augment natural sources with discharge from Los Angeles County Sanitation District's sewage-treatment facility and the triggering of the Portuguese Bend landslide. Heavy minerals in very fine and fine sand (63-250 μm) from beach and shelf sites off the Palos Verdes Peninsula, Southern California, distinguish effluent-affected sediment from unaffected deposits, and track the sediment contributed by the historic Portuguese Bend landslide. Heavy minerals also identify inhomogeneous sediment sources for the nearshore zone and relate outer-shelf sediment to depositional cells north and south of the area.

Sediment samples were collected by the USGS in 1992 and 1993 as part of a multidisciplinary examination of contaminated sediment on the Palos Verdes margin. Factor analysis of the heavy-mineral data identified several depositional provinces in the Palos Verdes margin that are non-overlapping at a factor loading of 0.6 or more. Province 1 is concentrated on the outer shelf and has the regional mineralogic signature of shelf sediment collected between Los Angeles and the U.S./Mexico border (hornblende, epidote, sphene, apatite); these minerals point to sources in the Transverse and Peninsular Ranges of southern California. Province 1 represents the sediment unaffected by effluent. Province 2 is characterized by titanite and tracks the advance of sediment shed from the Portuguese Bend landslide in a band 2 km cross-shelf by 10 km along the coast. Province 3 represents the lower-density effluent-affected deposit and consists of samples with regional mineralogy (province 1) modified by components such as mica and carbonate fragments. Several areally limited provinces occur in the nearshore and point to local and inhomogeneous sources of sediment. The historic introduction of effluent-laden sediment on the shelf is evident in a vertical change from lower to uppermost strata in mineralogy from a pre-effluent regional signature to an effluent-affected mineral suite and back again.

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